REMARKS/ARGUMENTS

Claims 14-39 are pending in the present application. Claims 14-39 stand rejected for the reasons indicated in the Office Action. In response, claims 14, 16, 19, 21 and 33 have been amended, and new claims 40-43 have been added. No new matter is added by these amendments. Entry of these amendments is requested.

With Respect to the Status of the Claims:

In the present Office Action dated February 22, 2006, the United States Patent and Trademark Office indicated that claims 1-26 were pending. In fact, the claim set was amended on January 13, 2006 and that amendment was received by the United States Patent and Trademark Office replacing the original claim set of claims 1-13 with claims 14-39. Per a telephone conference with Examiner Khatri on April 12, 2006, the Response and Amendment is being filed with respect to the pending amended claim set, claims 14-39.

The Applicant also wishes to draw to the attention of the United States Patent and Trademark Office that the specification was also replaced with a substitute specification on January 13, 2006, and requests that the United States Patent and Trademark Office make certain that the substitute specification has replaced the original specification in the official record.

With Respect to the Amendments to Claims 16, 19 and 21:

Claim 16 has been amended. Support for this amendment can be found in the application on page 7, line 14. Claims 19 and 21 have been amended to correct typographical errors.

With Respect to the Rejections under 35 U.S.C. §102, Pages 2-6 of the Office Action:

Claims 1-2 and 4-26 stand rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 4,102,562 to Harper et al. for the reasons indicated in the Office Action. These claims correspond to pending claims 14-15 and 17-39, and these latter claim numbers will be used hereafter in this response.

With respect to claims 14 and 33, the only independent claims in the pending claim set, the United States Patent and Trademark Office stated that:

> Harper et al. discloses wherein a retroreflective printed (see figure 2) material comprising:
> a) a microspheres layer (11);
> b) a priming layer (Col 3 lines 54-60) on the microsphere layer;
> c) a printed design layer (16) on the primer layer;
> d) a binder layer (14) on the printed design layer;
> e) a base fabric (13) on the binder layer; and
> f) a reflecting layer (dielectric mirror layer shown with heavy line, Col 3 lines 41-43);
> where the reflecting layer is either between the microsphere layer and the priming layer (the reflecting layer is interpreted to be between the microsphere layer and priming layer because the reference suggests the layer coats the exposed surfaces of the microspheres), or is between the printed design layer and the binder layer.
> The process of manufacturing a retroreflective printed material and the steps of providing, applying and transferring are inherently [met] by the disclosure of the prior art.

First, layer 13 in the '562 Patent is the base sheet of the support sheet, not a base fabric as indicated above by the United States Patent and Trademark Office. See, for example, col. 3, lines 33-38 (emphasis added):

> Sheet material 10 as shown in FIG. 1 was prepared by cascading transparent glass microspheres 11 of about 1.92 refractive index and ranging in diameter from about 70 to 100 micrometers onto a support sheet 12 consisting of **Kraft paper base sheet 13** covered with a heat-softenable layer 14 of low-density polyethylene;

The "fabric" shown in Figure 3 of the '562 Patent appears to be shown as the wavy line with cross-hatching, but is not given a reference number in Figure 3 or in the '562 disclosure. The reason for the confusion could be that the orientation of the layers in Figure 2 and Figure 3 of the '562 Patent are reversed from each other.

Second, similarly, layer 14 in the '562 Patent is the heat-softenable layer of the support sheet, not a binding layer on the printed design layer as indicated above by the United States

Patent and Trademark Office. See, for example, col. 3, lines 33-38, above. The '562 Patent does not in fact appear to disclose a discrete binding layer applied on the "printed design layer such that the entire printed design layer is covered with the binder layer" as recited in amended claim 14, or a discrete " binder layer completely covering the priming layer" as recited in amended claim 33. Instead, the '562 Patent appears to disclose a "transfer layer 16" comprising the design and while having specific adhesive properties (emphasis added):

> ...and a thick transfer layer printed over a limited portion of the continuous layer of microspheres in an imagewise pattern, the parts of the microspheres exposed above the support sheet being embedded in the patterned layer, and **the transfer layer being adhereable to a substrate while retaining its imagewise pattern.** [col. 2, lines 1-7
>
> This new transfer sheet material is used by laying it on a substrate, **with the transfer layer against the substrate; adhering the transfer layer to the substrate**; and then stripping the support sheet away. Thereupon the continuous layer of microspheres is divided: the microspheres embedded in the adhered patterned layer are pulled out of the support sheet that previously held them, and the remaining microspheres are carried away with the support sheet. An emblem, comprised of the transfer layer and a layer of microspheres partially embedded in the transfer layer and partially exposed above the transfer layer, is left in place on the substrate. [col. 2, lines 8-19]
>
> **Even when printed in such thick layers, vinyl plastisol inks exhibit the needed adhesive but image-retaining condition during a transfer operation; that is, they soften so as to adhere to a substrate or penetrate into a fabric, but they do not smear or flow out of the image shape. Transfer layers that retain an imagewise pattern throughout a transfer operation can also be provided in other ways, as by including in the transfer layer a material that is adhesive without use of heat, e.g. a pressure-sensitive adhesive, in which case sheet material of the invention will generally include a release liner covering the adhesive surface of the transfer layer.** [col. 6, line 60 through col. 7, line 4]

> **The transfer layer must be thick enough so that there is adequate support for the glass microspheres, and when used on fabrics, sufficient ink material to penetrate and attach the transfer to the fabric.** [col. 7, lines 5-8]

This distinction is relevant because the present invention can include a reflecting layer "on the printed design layer between the printed design layer and the binder layer" (claim 14) or "between the printed design layer and the binder layer" (claim 33), whereas the invention disclosed in the '562 Patent cannot include a reflecting layer "between the printed design layer and the binder layer" because the transfer layer 16 must adhere directly to the fabric.

Therefore, claims 14 and 33 are believed not to be anticipated by the '562 Patent. Claims 15 and 17-32 depend on claim 14, claims 34-39 depend on claim 33, and withdrawal of this rejection with respect to claims 14-15 and 17-39 is requested.

Third, the microsphere layer of the present invention completely covers the viewable surface of the retroreflective printed material, as claimed in amended claim 14, step f), "and completely separating the temporary support sheet from the layer of microspheres, thereby creating the retroreflective printed material"; and as claimed in amended claims 33, step a), "a microspheres layer completely covering the viewable surface." By contrast, the microsphere layer 11 of the retroreflective printed material disclosed in the '562 Patent is present in the final product only over the designs, as shown in Figure 3, and in some of the sections cited with respect to the paragraphs below. Incomplete coverage of the retroreflective printed material by the microsphere layer leads to a palpable edge around the designs and contributes to wear at the edges of the designs.

Therefore, claims 14 and 33 are believed not to be anticipated by the '562 Patent. Claims 15 and 17-32 depend on claim 14, claims 34-39 depend on claim 33, and withdrawal of this rejection with respect to claims 14-15 and 17-39 is requested.

Fourth, the present invention is a process for manufacturing a retroreflective printed material, where the ENTIRE surface of the material is retroreflective because the reflective layers are present over the entire surface of the material, even though the material has graphics

in some areas, but not in other areas. This is disclosed throughout the present application, and is specifically shown in Figures 1-3, 5 and 6.

The '562 Patent, by contrast, discloses a method of making a material having a retroreflective design or emblem, but where the retroreflectivity is confined to the design or emblem, or is greatly increased over the design or emblem, and where the remainder of the material is either not retroreflective at all or is only slightly retroreflective as compared to the areas of the design or emblem, because all of the reflective layers are NOT present over the entire surface of the material. See, for example, the following passages (emphasis added):

> Retroreflective images are formed on garments and other substrates with a transfer sheet material that comprises a support sheet, a dense continuous monolayer of transparent microspheres partially embedded in the support sheet, and **a thick transfer layer printed over a limited portion of the continuous layer of microspheres in an imagewise pattern.** In use the transfer sheet material is laid against a substrate, the transfer layer adhered to the substrate, and the support sheet stripped away. **The transfer layer remains in place and pulls the microspheres from the support sheet, leaving a sharply defined design that is retroreflective over the full area of the design.** [Abstract]

> The present invention provides a novel transfer sheet material useful for forming retroreflective graphic images on a substrate, including fabrics as well as other substrates. This new transfer sheet material comprises, briefly, a support sheet that includes a dimensionally stable base sheet and a heat-softenable exterior layer carried on said base sheet; a dense continuous monolayer of transparent microspheres partially and removably embedded in the heat-softenable layer to a depth averaging between about one-quarter and one-half of their diameters and partially exposed above the support sheet; a specularly reflective layer covering the exposed surfaces of the microspheres; **and a thick transfer layer printed over a limited portion of the continuous layer of microspheres in an imagewise pattern**, the parts of the microspheres exposed above the support sheet being embedded in the patterned layer, and the transfer layer being adhereable to a substrate while retaining its imagewise pattern. [col. 1, line 57 through col. 2, line 7]

This new transfer sheet material is used by laying it on a substrate, with the transfer layer against the substrate; adhering the transfer layer to the substrate; and then stripping the support sheet away. **Thereupon the continuous layer of microspheres is divided: the microspheres embedded in the adhered patterned layer are pulled out of the support sheet that previously held them, and the remaining microspheres are carried away with the support sheet. An emblem, comprised of the transfer layer and a layer of microspheres partially embedded in the transfer layer and partially exposed above the transfer layer, is left in place on the substrate.** [col. 2, lines 8-19]

Despite the beaded nature of the described microsphere-covered support sheet, transfer inks such as vinyl plastisol inks can be printed into the support sheet in the needed thickness with good definition of design. Further, when the transfer layer is transferred, generally through use of heat and pressure, it transfers with sharp definition. The result is that retroreflective emblems having the same order of definition of design obtained in non-reflective heat-transferred emblems may be obtained. **Multi-colored, intricately patterned designs may be formed, and the designs may be formed in separated parts, adhered to the garment in isolation from other parts with no connecting web or marginal adhesive area between the parts. Designs may be formed with the same fine detail and separation as characterizes embroidered stitchery.** [col. 2, lines 20-35]

Yet the designs are retroreflective in each and every part, up to the exact edges of the design areas. There is no misalignment of design and retroreflective areas, since the microspheres transfer out of the support sheet, providing retroreflection in exact registration with the design. [col 2, lines 36-41]

Support sheets as described above, in which microspheres are temporarily supported and then removed after some subsequent operation, are well known in the art. Generally the support sheets have been used as a temporary support while a specularly reflective coating was applied to the microspheres or as a carrier while a reflective sheeting was built by a series of coating operations over the microspheres; see McKenzie, U.S. Pat. No.

3,190,178; and Sevelin et al., U.S. Pat. No. 3,801,183. **However, insofar as known, such support sheets have never been used in the manner described above, in which a transfer ink is first printed onto the partially embedded, partially protruding microspheres in an imagewise pattern that extends over only a portion of the layer of microspheres;** the transfer ink is then adhered to a substrate; and the support sheet stripped away, whereupon the layer of microspheres is divided, **with the transfer layer pulling the microspheres out of the support sheet so as to provide the described fully reflectorized isolated images.** [col 2, lines 49-68]

All in all, the invention provides emblems having all the previous features of emblems on garments, but with the added feature of retroreflectivity, which was never previously obtained in such emblems. And the invention provides such emblems simply and at little added cost. [col 3, lines 1-6]

While the invention is particularly adapted to retroreflectorization of fabrics, and is discussed herein particularly in that context, the invention is also useful to retroreflectorize other substrates, including smooth-surface sheets or articles. **In general, the invention is most useful when it is desired to provide isolated images on a substrate reflectorized in exact registration with the images.** [col 3, lines 7-14]

The different samples of sheet material were then used to apply emblems on a variety of fabrics, including cottons, and cotton-polyester blends. The completed sheeting as illustrated in FIG. 2 was laid against the fabric, transfer- or patterned-layer side down, and the assembly was placed in a heat-transfer machine set at 350.degree. F. to 400.degree. F. (175.degree. C. to 200.degree. C.), where pressure was applied for 30 seconds at the lower temperature or 10 seconds at the higher temperature. During this time the ink softened and penetrated into the fabric. **After allowing the assembly to cool, the support sheet 12 was peeled back and removed, whereupon the layer of microspheres was divided as shown in FIG. 3. In the areas occupied by the transfer layer 16, the microspheres separated from the support sheet and remained adhered in the transfer layer; in areas where no transfer layer was present, the**

> **microspheres remained in the support sheet and were pulled away with the support sheet.** The microspheres remaining on the fabric were partially exposed with their uncovered surface facing outwardly and their embedded surface covered with a dielectric mirror. Since the dielectric mirror was transparent, the design was visible underneath the layer of glass microspheres. [col 4, lines 45-68]
>
> The daytime appearance of the resulting fabrics and transferred emblems was similar to that obtained with heat transfers that carry no layer of microspheres, except that the emblems had a somewhat matte finish and were slightly more frosty because of the presence of the microspheres. **The transfer of ink and of microspheres was well defined and essentially as sharp as that of a conventional vinyl ink transfer on garments.** [col 5, lines 1-8]
>
> A representative transferred design is illustrated in FIG. 4. As seen the whole transferred material is design (in contrast to conventional decals; there is no connecting material between the leaves and flowers, for example). **Yet the whole of the design is retroreflective, with microspheres covering all of the transferred design.** When the fabrics were illuminated in a dark room, the transferred emblems reflected with from 50 to 225 candle power/foot candle/square foot when viewed at -4° incidence at a 0.2° divergence angle. [col 5, lines 25-34]

Additionally, Figure 3 of the '562 Patent clearly shows that the microspheres 11 and the dielectric mirror (shown as the heavy line in Figures 1, 2 and 3 but not given a reference number; see col. 3, lines 42-43) are only transferred to the material where there is a design or emblem 16 transferred.

Therefore, claims 14 and 33 are believed not to be anticipated by the '562 Patent. Claims 15 and 17-32 depend on claim 14, claims 34-39 depend on claim 33, and withdrawal of this rejection with respect to claims 14-15 and 17-39 is requested.

With Respect to the Rejections under 35 U.S.C. §103, Pages 6-7 of the Office Action:

Claim 16 stands rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent No. 4,102,562 to Harper et al. for the reasons indicated in the Office Action.

Claim 16 depends on claim 14, which is believed to be allowable as indicated above, and withdrawal of this rejection is requested.

With Respect to the New Claims 40-43:

New claims 40-43 have been added to further distinguish the present invention from the disclosure of the '562 Patent. Support for the subject matter of claims 40-43 can be found in the present application at page 9, lines 22-25, among other places:

> A printed design layer 6 is disposed on the priming layer, and preferably has a thickness of less than 0.1 micron in the case of designs with sublimate pigments printed on a paper base, and less than 0.5 microns in the case of designs having a polymer film supported by a release paper base or a polymer film base.

The "printed design layer 6" of the present disclosure is not used to support the glass microspheres and hence can be applied in an extremely thin layer. By contrast, the "transfer layer 16" disclosed in the '562 Patent, which corresponds to the "printed design layer 6" of the present disclosure, is used to support the microsphere layer and therefore, must be thicker by a factor of about 100 times than the "printed design layer 6." See, for example:

> The dry transfer layer of ink 16 varied in thickness generally from about 40 to 75 micrometers, depending on the number of sublayers in a particular area of the layer 16. [col. 4, lines 40-43]

> The transfer layer must be thick enough so that there is adequate support for the glass microspheres, and when used on fabrics, sufficient ink material to penetrate and attach the transfer to the fabric. To obtain good adhesion to fabric, the transfer layer should have a thickness of at least 25 micrometers and preferably at least about 40 micrometers. Generally the transfer layer will be less than 150 micrometers, and preferably less than 100 micrometers, in thickness. Thicknesses of about the same order of those for non-reflective ink transfers can be used. [col. 7, lines 5-15]

Therefore, claims 40-43 are believed to be allowable over the '562 Patent and an indication of such is requested.

CONCLUSION

The Applicants believe that all pending claims, claims 14-43, are now believed to be in condition for allowance and a Notice of Allowance is requested. If, however, there remain any issues which can be addressed by telephone, the Examiner is encouraged to contact the undersigned.

No fee is believed due in connection with this communication. If, however, any fee is owed, the Commissioner is hereby authorized to charge payment of the fee associated with this communication to Deposit Account No. 19-2090.

Respectfully submitted,

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